EXPERIMENTAL STUDIES

These studies are concerned with certain problems best studied in the laboratory that will enable better interpretation of data collected from a wild population. The nature of growth and its periodicity in fishes, the factors that cause mortality in larval fish and similar studies will be carried out. The personnel assigned to this group are also concerned with the management of the aquarium. The techniques used in these two studies are similar and the problems related.

SUMMARY COL OL SCHEDULE

Investigation: Experimental studies Biological Leberatory: Woods Hole, Mass.

| | 6 | * 18H | | - | | 54 | iscal Ye | Years | | | |
|--|--|--|----------|--------------|-------------------------|----------|------------|-------------|--------------|---|--------|
| | Froject Title | Cost | 52 | <u>ش</u> | 9 65 | 19 09 | 1 62 | 63 | 79 | 59 | 99 |
| | Lab techniques for culture of Marine fish | 78.4 | ; | 1 | | 14.2 10. | 60 | 4 11.6 | 9.7 | 10. | 612. 6 |
| 2. Rate of ascent to | o Pelagic eggs | 23.7 | ! | - | 113. | 3 10.4 | i | | | 1 | 1 |
| | Sustained swimming rate of larval fish | 17.3 | 1 | - | | | | ; | 1 | | 1: |
| 4. Effect of Tempe | rature on Meristics | 29, 5 | 1 | _ | - | t | 8.2 | F | | 1 | 1: |
| | nment of Growth Rate | 38,8 | ŀ | | 1 | | 9 | 11.6 | 2 6 | æ | Ti |
| | ing Annulus formation | 44, 5 | 1 | 1 | 1 1 | | 1 | | 6 7 | 0 | 2 |
| | Studies of behaviour of larval fish | 32. 2 | : | 1 | I | - | 1 1 | - | 6 | ᇹ | 10 |
| 8. Effects of Photo | Effects of Photo period and temperature on S | n Spawning | ŀ | 1 | | | | 1 | 1 | 7. | 6 |
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| | Annual Review | A SALATAN BANKALIN AND SALATAN | | | | 4 | | | | Date | • |
| Laboratory | Regional or Area Office | Essimaton Office | Prec | Prepared 1 | by: | D. Mi | Miller | | 8/6 | /6/59 | T |
| | | | Rec | Recommented | ્તે byr | | | | | Drte | |
| | | | Tel | Dir. | lab. Director Herbert W | Herbe | rt W. | Graham | | 8/6/29 | ſ |
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| | | | bra | branch Chief | nicf | 24 | HB. | 12-4 | 24-5 | - |] |
| | 24-114 | | add y | Approved 1 | b ₇ . : | | | | | | |
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^{*}Total needed by Laboratory for Project in thousands of dollars.

U. S. Fish and Wildlife Service Bureau of Commercial Fisherics

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File Ne.

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Research Project Outline

| Title of Project: | Laboratory te | e chniq u | es for the cultu | re of mar | ine fish |
|----------------------|-------------------------|------------------|------------------------|-----------|----------|
| Investigation Title: | Experime | ntal st | u d ie s | | |
| Investigation Chief: | Warred C | harles | Wheeler | | |
| Project Leader: Ch | arles Wheel | er | F. R. B. | GS-11 | |
| - | Name | | Title | | Grade |
| Assistants: (Title | and Grade) | | | | |
| | F.R.B. ent assistant | GS-9 GS-4 | 4 (Temporary) | | |
| Collaborators: | | | | | |

Need for Information: Standard methods for rearing marine fish under laboratory conditions must be developed as a prerequisite to any further experimental work in this general field.

Objective: To develop and standardize techniques for the holding and rearing of commercial species of marine fish, both young and adult.

Method of Procedure: Through experimentation, determine the necessary

gross requirements of space, circulation, temperature,

Phase 1: salinity, oxygen, light, and food, essential to the

laboratory culture of fish.

From a knowledge of these requirements, set up standard methods of rearing against which various

experimental procedures may be tested.

Phase 2: Assemble a bibliography of the literature on the culture

of marine fish larvae.

Publish results.

Exp. Studies - 1
Sheet No. 2

Filc No.:

Method of Procedure: (Cont'd)

Phase 3:

| Estimated Costs: Total | Needed by Laborate | ory for Complete Project | 78.4 |
|---|--------------------|-----------------------------------|-----------------------|
| | FY 1959 | FY 1960 | FY 1961 |
| Personal Services Other Expenses: | | 5, 2 | 3.6 |
| Within Project | | 0.1 | 0.9 |
| Lab. Adm. & Ser. | | 8,9 | 5.8 |
| Lab. Total | | 14.2 | 10.3 |
| Regional Office Washington Office | | .142 | •103 |
| Total | | | |
| Recommended Source of Fu . Estimated Date of Comple | (S- | Regular -K, Regular, Contributed, | |
| Recommended by: Originator C. L. W | heeler | | <u>Date</u> 8/6/59 |
| Investigation Chief | C. L. Wheeler | | 8/6/59 |
| Laboratory Director | Herbert W. Graha | | 8/6/59 |
| Regional Director | Joseph & Pers | ice lier | 8/19/59 |
| Branch Chief | JHE. | | 12-24-59 |
| Approved by: Division Chief for Dir | ector | | , |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Scrvice Bureau of Commercial Fisherics

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File Ne.

Research Project Outline

| Title of Project: Ra | te of ascent | of pe la gic eg | gs in waters | of known density |
|---|---|---------------------------------|--|---|
| Investigation Title: | Experime | ntal studies | | |
| Investigation Chief: | XXXXXX | C. L. Wheeler | • | |
| 0 | be assigned | Tit) | | Grade |
| : Assistants: (Title and | | 1103 | .С | Grade |
| Cellaborators: | | | | |
| Need for Information: and the arrival for most specie concentrations on the bottom. | of pe la gic eg s. This info | ggs at the sur ormation is o | f a ce la yers is f value in rela | s not known ating large |
| Objective: To measu eggs of the mor | | | ne n ewly sp aw species. | med pelagic |
| Method of Procedure: Phase 1: | for measur of varying the eggs of | ing the ascendensity. Mea | t of pelagic egasure the rate for which this | tory apparatus ggs in waters e of ascent for s information |

Phase 2:

Exper. Studies - 2 Shcet No. 2

Filc No.:

Method of Procedure: (Cont'd)

Phase 3:

| Estimated Costs: Total | . Needed by Laborat | ory for Complete Project | 23.7 |
|-------------------------------------|---------------------|--|----------------|
| | FY 1 <u>959</u> | FY 1 <u>960</u> | FY 1961 |
| Personal Services Other Expenses: | Pris 200 | 4.3 | 3.0 |
| Within Project | | 0.1 | 0.9 |
| Lab. Adm. & Ser. | | 8.9 | 6.5 |
| Lab. Total | | 13.3 | 10.4 |
| Regional Office Washington Office | | .133 | .104 |
| Total | | | |
| Recommended Source of Fu | uius | d Regular -K, Regular, Contributed, | etc.) |
| Estimated Date of Compl ϵ | tion: Phase 1 FY 6 | 0; Phase 2 FY ; Phase 3 FY | :Project FY 61 |
| Recommended by: Originator C. L. | Wheeler | | 8/6/59 Date |
| Investigation Chief (| C. L. Wheeler | | 8/6/59 |
| Laboratory Director | Herbert W. Graha | am | 8/6/59 |
| Regional Director | Joseph & Par | melia | 8/19/59 |
| Branch Chief | 1 SLHE. | | 12-24-59 |
| Approved by: Division Chief for Dir | ector | | , |

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Scrvice Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass. Date: Filo No. August 6, 1959

Research Project Outline

| Title of Project: De | etermi na tion | of sustained swimm | ing rate for larval fish. |
|---|--|---|---------------------------------------|
| Investigation Title: | Experime | ntal studies | |
| Investigation Chief: | ********** | C. L. Wheeler | |
| | be ass igned | Title | Grade |
| : Assistants: (Title an | d Grade) | | |
| | | | |
| | | | |
| Collaborators: | | | |
| | | | |
| become free of the | he mercy of e influence o nt of their sy ng rates for | ocean currents. The f these currents dependent wimming ability. Kn various species wou | ends in part upon the lowledge of the |
| Objective: To determ fish of various age increase in age. | nine the net pes, and the r | potential for locomotrate at which this abi | ion of larval lity increases with |
| Method of Procedure: Phase 1: | sustained a out control | swimming rate of lar lled experiments to d | |

Phase 2:

Exp. Studies - 3 Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

| Estimated Costs: Total | l Needed by Labora | atory for Complete Project | 17.3 |
|---|--------------------|---|-------------|
| | ^{FY} 1959 | FY 1960 | FY_1961_ |
| Personal Services | 300 MA | | 2.5 |
| Other Expenses: Within Project | | | 0.9 |
| Lab. Adm. & Ser. | | | 5.7 |
| Lab. Total | | | 9.1 |
| Regional Office Washington Office | | | •091 |
| Total | | | |
| Recommended Source of Formated Date of Comple | | K and Regular (S-K, Regular, Contributed 61; Phase 2 FY ; Phase 3 | |
| Recommended by: | L. Wheeler | <u></u> | 8/6/59 Date |
| Investigation Chief | C. L. Wheeler | | 8/6/59 |
| Laboratory Director | Herbert W. Grah | | 8/6/59 |
| Regional Director | Joseph & Very | wehai | 8/19/59 |
| Branch Chief | V 2418. | | 12.24-59 |
| Approved by: Division Chief for Div | rector | | · |

Remarks

(Continue on reverse side)